THE ANNALS

AND

MAGAZINE OF NATURAL HISTORY.

[EIGHTH SERIES.]

No. 81. SEPTEMBER 1914.

XXVII.—*On some Oriental* Nycteribiidæ [*Diptera Pupipara*].

By Hugh Scott, M.A. (Cantab.), F.L.S., F.E.S., Curator in Entomology in the University of Cambridge.

[Plates X.–XII.]

This paper consists of two sections:—(I.) on material recently received from Ceylon and India; (II.) containing a redescription of a species, *Nycteribia parilis*, originally described by Walker from the Moluccas. But before proceeding to the first of these the writer may be excused for inserting some more general remarks.

Preservation and Description of *Nycteribiidæ*.

The descriptions and redescriptions of species included in this paper were made from specimens preserved in alcohol; the figures also were drawn from specimens lying in that fluid under a low power of the microscope, with the help of a drawing-apparatus. The writer has already pointed out * that Nycteribiidæ are absolutely unfitted for being preserved dry. The most important distinguishing characters often lie in the form and number of the segments of the abdomen. This is particularly the case in the ♀, in which sex the

* Arch. Naturg. lxxix. A, 1913, p. 93.

abdomen consists largely of collapsible connexival membrane. Hence with complete dessication the segments become so shrunk, distorted, and telescoped one under the other that specific characters may be made almost entirely unrecognizable. The same statements apply in a less degree to the ♂. It is practically impossible to determine species from some of the earlier descriptions, which have been rendered incomplete or false by the dried and shrivelled condition of the material from which they were made. Much error and confusion is likely to arise in consequence of this. By a thorough soaking in water old dried specimens can sometimes be induced to reassume in some measure their proper form, and they can then be gradually transferred to weaker, and afterwards to stronger, alcohol.

In studying Nycteribiidæ—even those properly preserved in alcohol—very great allowance must be made for the changes in appearance caused by the varying condition of the abdomen, particularly in the ♀ sex. Descriptions and figures will differ greatly according as they are taken from ♀ ♀ in an advanced stage of gestation or from specimens with empty shrunken bodies. For the same reason two ♀ ♀ of the same species may look so different from one another that careful study of the parts of the abdomen is required to establish their specific identity.

For the same cause it is sometimes impossible to include in a single camera-lucida drawing all parts of one aspect of the abdomen. For example, in a dorsal view the basal segments may, owing to curvature, be almost perpendicular to the field of vision. In such cases it may be necessary to make two outline drawings of the specimen tilted at different angles, and to compound them into a single figure showing all the segments. Allowance must be made for this in using the figures on the Plates attached to this paper.

Fault may be found with the great length of some of the writer's descriptions and with the omission of short diagnoses; but it seems at present impossible to avoid making very long and detailed descriptions of these insects. Such important characters are presented by the abdomen that it appears necessary to describe in detail the form of each dorsal and ventral segment in both sexes. Much trouble arises from the inadequateness of earlier descriptions; a number of species have been placed in wrong genera, and this cannot always be discerned from their descriptions alone. Moreover, the writer is uncertain whether the present system of genera is satisfactory. When the generic position of the species is more settled, and those of the same

genus have been more thoroughly compared one with another, it may be possible greatly to shorten specific descriptions.

Stress has been laid on the importance of the form of the abdominal segments. It may be added that in this respect the ♀ ♀ often furnish far more distinctive characters than the ♂ ♂. But, beyond an examination of the form of the ♂ claspers, no study has yet been made of the genital apparatus in either sex. Such a study might considerably modify present views on the species, and might prove that the ♂ ♂, which sometimes appear almost inseparable, really possess distinguishing characters as good as those of the ♀ ♀.

I.—*Nycteribiidæ* from Ceylon and India.

The material dealt with here consists almost entirely of a collection made by Mr. J. C. F. Fryer in Ceylon in 1911 and 1912. I have, however, included two species, examples of which were recently collected in India by Mr. T. Bainbrigge Fletcher: one of these, *Cyclopodia roylei* (Westw.), is also contained in Fryer's Ceylonese collection; the other, *Penicillidia fletcheri*, is the only form here described as a new species, and it is represented among the Ceylonese material by a varietal form also described as new under the name *Penicillidia fletcheri*, var. *pumila*.

The subjoined list (p. 212) enumerates the species discussed, showing also their distribution and hosts so far as these are at present known. With the exception of no. 2, the type-form of *Penicillidia fletcheri*, all are now known from Ceylon; and as, to the best of my knowledge, no other species has been recorded therefrom, the list includes the whole Nycteribiid fauna of that island as known up to the present time. The seven forms new to Ceylon are marked with an asterisk. Moreover, *Penicillidia jenynsi* was previously only doubtfully recorded from that island, the only sure record for which appears to have been that of *Cyclopodia sykesi*.

Besides the description of the new species and new variety, previous descriptions of certain other species are amplified and modified, and some forms not hitherto illustrated are figured. Thus, *Nycteribia* (*Acrocholidia*) *euxesta* (Speiser) is removed from the genus *Penicillidia*; the abdomen is fully described, and figures are published for the first time. *Cyclopodia ferrarii* has not previously been figured, and earlier descriptions of it are amplified. *Cyclopodia roylei*, formerly placed in *Nycteribia*, is fully described

	Distribution.	Host or Hosts.
1. *Penicillidia jenynsi* (Westw.)	China, Formosa, Sumatra, Ceylon.	*Miniopterus schreibersi.*
2. *Penicillidia fletcheri*, sp. n.	Madras.	*Pipistrellus dormeri.*
2 *a*. **Penicillidia fletcheri*, var. *pumila*, var. n.	Ceylon.	*Pipistrellus abramus.*
3. **Nycteribia* (*Acrocholidia*) *euxesta* (Speiser).	Burma, Ceylon.	*Hipposideros armiger.* *Hipposideros lankadiva.*
4. **Nycteribia* (*Listropodia*) *allotopa*, Speiser.	China, Formosa, Sumatra, Ceylon.	*Miniopterus schreibersi.*
5. **Nycteribia* (*Listropodia*) *parvula*, Speiser.	Formosa, Sumatra, Ceylon.	*Miniopterus schreibersi.*
6. **Cyclopodia ferrarii* (Rondani)	Java, Sumatra, Burma, Ceylon.	*Cynopterus brachyotis ceylonensis.*
7. **Cyclopodia roylei* (Westw.)	Malay Peninsula, India, Ceylon.	*Scotophilus heathi.* *Scotophilus kuhli.* *Scotophilus wroughtoni.* *Tylonycteris pachypus.* *Megaderma lyra.*
8. *Cyclopodia sykesi* (Westw.)	India, Ceylon.	*Pteropus giganteus.*
9. **Eucampsipodia hyrtli* (Kolenati)	Senegal, Egypt, Comoro Islands, Ceylon, Burma, Sumatra.	*Rousettus ægyptiacus.* *Rousettus* sp. (Comoro Is.). *Rousettus seminudus.* *Tylonycteris pachypus.*

and figured in the ♀ sex. *Eucampsipodia hyrtli* had only been figured in the ♂ sex; figures of the ♀ are now published.

Remarks on the Hosts.—It will be noticed that three of the species are recorded from more than one species of bat. Of these *Nycteribia* (*A.*) *euxesta* has been found on two species of the same genus, *Hipposideros*; *Cyclopodia roylei* has been taken on three closely allied forms of the insectivorous *Scotophilus* and on two other quite distinct hosts, one of which is also an insectivorous form (*Tylonycteris pachypus*), while the other is the bat-eating bat *Megaderma lyra*. Both the other species of *Cyclopodia* have been found only on fruit-eating bats, *C. ferrarii* on *Cynopterus*, and *C. sykesi* on the great Indian "flying-fox" *Pteropus giganteus*. The case of the widespread *Eucampsipodia hyrtli* is remarkable: it appears to infest the large fruit-eating bats of the genus *Rousettus* and the small insect-eating *Tylonycteris pachypus*. With the exception of the fruit-eating *Cynopterus* and *Pteropus*, and of *Megaderma lyra*, all the other hosts are insect-eaters. These remarks were suggested by information received from Mr. Oldfield Thomas, to whom I am much indebted for help. To him also is due the determination of the bats on which Fryer's material was found.

Penicillidia, Kolenati.

1. *Penicillidia jenynsi* (Westwood).

Nycteribia jenynsi, Westwood, ♂, Trans. Zool. Soc. London, i. 1835, p. 291, pl. xxxvi. figs. 29–34.
Penicillidia jenynsi, Speiser, ♂, Arch. Naturg. lxvii. 1, 1901, p. 28.
Penicillidia jenynsi, Scott, ♂ ♀, Trans. Ent. Soc. London, 1908, p. 360, pl. xviii. figs. 1–8; id. Arch. Naturg. lxxix. A, 1913, p. 95.

This species was originally described from China. Schiner somewhat doubtfully referred to it a single specimen (a ♂, judging from his remarks) obtained in Ceylon ('Novara Reise,' Diptera, 1868, p. 375). Speiser, in his revision of the family, included Schiner's record, but quite rightly queried it (*op. cit.* p. 49). The occurrence of the species in Ceylon is now established by the fact that 2 ♀ were collected at Peradeniya by Fryer. I have already referred to these two specimens in discussing a long series from Formosa (1913, *l. c.*). They present certain variations in detail from the form described as the type ♀ in 1908, variations which are also found in some of the Formosan examples. These variations consist principally in certain

parts being more "bristly" than in the type-form. Thus (i.) the second tergite, instead of having its surface quite bare, has very short scattered bristles in the middle of its disc, covering a roughly triangular area extending forwards from the hind margin; (ii.) the two ventral chitinous areas (Scott, 1908, *op. cit.* fig. 4 *b*) have the stiff erect bristles on their surfaces extending further forwards, instead of only present near their hind margins; (iii.) the transverse chitinous area (*op. cit.* fig. 4 *c*) has short erect bristles scattered over its surface, not only present near its hind margin. Variation of a somewhat like nature has been observed in *Nycteribia* (*Listropodia*) *allotopa*, Speiser (see p. 221).

One of the specimens has a Laboulbeniaceous fungus growing on its abdomen, to which I have already referred (Arch. Naturg. lxxix. A, 1913, p. 95).

Loc. China, Sumatra, Formosa, Ceylon.

Fryer obtained his two specimens from *Miniopterus schreibersi* at Peradeniya, x. 1911 and 30. i. 1912.

2. *Penicillidia fletcheri*, sp. n. (Pl. X. figs. 1–4.)

Length circa 2·5 mm.

Head bare, except for a few short bristles in the middle of the vertex in front and along the margins of the cheeks. *Eyes* black-pigmented. *Thorax* beneath (fig. 4) about $1\frac{1}{4}$ times as broad as long, nearly flat (*i. e. not* convex from front to back as in some species of *Penicillidia*), with middle line impressed behind; it has a characteristic fringe of bristles along its hind margin, about four longer ones on either side of the middle line, between each two of which are two or three shorter bristles; the four longer bristles become gradually longer from the one nearest the middle line to the outermost one. *Legs* apparently without noteworthy characters, not strikingly long; metatarsus slightly shorter than tibia.

♂ ABDOMEN (Pl. X. figs. 1, 2).—*Basal tergite* very small, not reaching to the sides of the abdomen, trapezoidal, its posterior margin shallowly and widely sinuate and without bristles in the middle, on either side with 4 or 5 short stout bristles, its disc bearing short bristles towards the sides, almost bare in the middle. *Tergites* 2–6 with surfaces bare except for some extremely short scattered bristles right at the sides, and which are also scantily present across the disc of tergite 2 near its base; hind margins set with long bristles and short thorn-bristles, 1–3 thorn-bristles between each two long bristles; the long bristles are longer in the

middle part of the margin than towards the sides, and in tergites 4, 5, and 6 these median ones become very long; on tergite 5 the marginal series is narrowly, and on tergite 6 widely, interrupted in the middle, but on the other tergites it is continuous. *Anal segment* tapering considerably, with sides slightly curved towards the apex, with short erect bristles on the posterior part of its surface and at the sides, and two moderately long ones at either hind angle.

Basal sternite with a slightly impressed middle line, surface fairly closely covered with bristles; ctenidium close, slightly sinuate in the middle. *Sternites* 2 and 3 have their hind margins set with moderately long bristles of slightly varying lengths, those at the sides rather longer than those in the middle; sternite 2 has two irregular series of very short bristles across its disc, and some longer suberect bristles at the sides of the disc; sternite 3 has one irregular transverse series, some of the lateral bristles of which are considerably longer and suberect. *Sternite* 4 longer; hind margin curved, bearing in the middle about 10 short, stout, thorn-like bristles; on either side of these are bristles of varying length, those at the sides being longer, and immediately in front of these marginal bristles are suberect bristles of varying length; across the posterior part of the disc is a very irregular series of rather short bristles, of which the median ones are nearer the hind margin than the lateral ones. *Anal segment* with rather numerous erect and suberect bristles at the sides; *claspers* nearly parallel, not contiguous, curved only in the dorso-ventral plane towards the apex, tapering, each with two bristles directed outwards in its median third, and other bristles directed inwards in its basal third.

♀ ABDOMEN (Pl. X. figs. 3, 4).—*Basal tergite* of much the same form as in ♂, but with the five bristles at either hind angle longer and stouter. *Tergite* 2 long, of remarkable form; subcordate, narrowed behind, each side being convexly curved in its anterior part and concavely sinuate in the narrower posterior part of the tergite; it is divided into two halves by a median longitudinal line of pale membrane, each half having an obliquely truncate hind margin bearing 4 or 5 long, stout, dark bristles, erect and directed outwards, immediately in front of them being a series of very short dark thorn-bristles; on the disc of the segment, at about $\frac{1}{4}$ its length from the hind margin, each half bears an irregular, oblique, transverse series of very short dark bristles; there are scattered very short bristles near the anterior angles of the tergite, and a few very minute ones

near the dividing-line, otherwise the surface is bare; each side-margin is bare except for 4 bristles at about the middle of its length; each half of the tergite has a streak of darker brownish pigment running from its outer hind angle, broadening and curving outwards in the anterior part, to the anterior angle. On either side of this tergite is pale *connexivum*, bearing extremely short minute bristles in front and longer ones behind; behind the tergite also is pale connexivum, bearing moderately long and stout dark bristles rather far apart; this is terminated by two slightly elevated more chitinized areas, separated by a moderately wide gap, and each bearing on its hind margin 3 or 4 very long, dark, stout bristles and a number of short dark bristles. *Anal segment* slightly tapering, its hind margin rather widely emarginate, its surface bare in the middle but with short erect bristles at the sides, its hind angles bearing each a group of 4 or 5 long bristles.

Ventrally (Pl. X. fig. 4) the material has not admitted of details being so clearly discerned. *Basal sternite* as in ♂. *Sternite* 2 membranous, bearing short bristles on its surface and a marginal series of moderately long bristles, longer at the sides, and rather spaced out. *Sternite* 3 represented only by a very short area of membrane, surface bare, marginal series of bristles similar to the preceding. *Sternite* 4 also membranous, but more firmly chitinized near its hind margin, which is widely and rather deeply sinuate in the middle, and which bears moderately long bristles widely spaced, some at the sides being suberect and very long. *Sternite* 5 much longer, consisting of two more chitinized halves divided by a median longitudinal streak of pale membrane; each half bears scattered, short, suberect bristles, and the hind margin has bristles of varying length, some (especially at the outer angles) being very long and suberect. *Subgenital plate* in the middle broadly membranous, pale, and bare; at the sides more chitinized, and bearing short suberect bristles; hind margin rounded, without bristles in its median part, on either side with 4 or 5 bristles, those nearest the middle being longest.

Loc. India.

1 ♂, 1 ♀, taken from *Pipistrellus dormeri*, at Coimbatore, Madras, 24. i. 1913, by T. B. Fletcher.

This species belongs to the section of the genus *Penicillidia*, in which the legs are not thickened, and in which "Haftscheiben"—that is, little hard chitinous plates thickly set with chitinous tubercles and situated on the abdomen (ventrally in ♂, dorsally in ♀)—are absent. It is note-

worthy that in *P. fletcheri* the ventral surface of the thorax is not convex from front to back, as it markedly is in several species of the genus. The most remarkable character of *P. fletcheri* as a species is the form of the dorsal abdominal segments of the ♀; their plan recalls that of *Nycteribia* (*Acrocholidia*) *fryeri*, mihi, described from Assumption Island, South-west Indian Ocean *. In the complete absence of eyes, the length and slenderness of its legs, the different form of its ventral thoracic plate, and in many other points, *N. fryeri* is entirely different from *P. fletcheri*, but the abdominal tergites of the ♀ are arranged on the same plan, though differing in details. In both species the ♀ has a small basal tergite, with hind margin sinuate or emarginate in the middle and a series of strong bristles at the hind angles; in both there is a large second tergite, longitudinally divided into two halves, each of which is produced behind. *P. fletcheri* is absolutely distinct from any Nycteribiid that I have seen, and I am unable to make it agree with descriptions or figures of any that I have not seen; it is dedicated to its collector, Mr. T. Bainbrigge Fletcher.

2 *a*. *Penicillidia fletcheri*, var. *pumila*, var. n.
(Pl. X. fig. 5.)

Length circa 1·5 mm.

Closely resembling the preceding, but very much smaller. Even allowing for the shrunken state of the abdomen in most if not all the specimens, there is a great difference in size; when var. *pumila* is viewed side by side with the type-form, it appears only about half as large.

In the ♂ the only other difference appears to be in the long bristles in the median part of the hind margins of abdominal tergites 4, 5, and 6; these are very long in the small form, proportionately longer than in the large ♂ of the type-form.

In the ♀ there are more decided differences (Pl. X. fig. 5). The narrow posterior part of *tergite* 2 is a little narrower in var. *pumila*; the 4 long bristles on the hind margin of each half are very long, appearing longer in proportion than in the type-form; the side-margin of each half, instead of having only 4 rather short bristles at about the middle, has 4 or 5 longer ones, widely spaced, extending from a little

* At the time of printing this paper my description of *N. fryeri* is not yet published; but it will appear shortly in Trans. Linn. Soc. London, ser. 2, Zool. vol. xvii.

before the middle to about ¾ the length. The median connexivum behind tergite 2 is bare, instead of having rather long bristles as in the type-form; and instead of being terminated behind by two wide chitinous elevated areas, much bristled, it has only two small tubercular prominences, each bearing three bristles. These last characters are the most important which I have found to separate var. *pumila* from typical *fletcheri*.

I do not consider the differences sufficient for the erection of *pumila* as a distinct species, and therefore place it as a "var." of *fletcheri*.

Loc. Ceylon.

3 ♂, 4 ♀, taken from *Pipistrellus abramus*, at Peradeniya, xi. 1911, by Fryer.

Nycteribia, Latreille.

Subgenus Acrocholidia, Kolenati.

3. *Nycteribia* (*Acrocholidia*) *euxesta* (Speiser). (Pls. X., XI. figs. 6–9.)

Penicillidia euxesta, Speiser, Arch. Naturg. lxvii. 1, 1901, p. 29.

This species was described from 2 ♂ and 1 ♀ from Burma, preserved in the Genoa Museum. Through the kindness of Dr. R. Gestro I have been able to examine these three original specimens, and find that 2 ♂ and 4 ♀ obtained by Fryer in Ceylon agree closely with them. The species, however, cannot be retained under the existing classification in the genus *Penicillidia*, since an examination with a compound microscope has convinced me that eyes are quite absent; it should be referred to the subgenus *Acrocholidia* of *Nycteribia*.

The length of the original specimens was given as 3·5 mm., that of the Ceylon specimens is about 3 mm. Speiser stated that the *thorax* ventrally was longer than broad; in the Ceylon specimens it is about as long as broad; in some specimens, owing to being curved upwards at the sides, it appears a little longer than broad, but measurement with the help of a drawing-apparatus has not shown this to be actually the case (Pl. XI. fig. 7).

The ABDOMEN was not very completely described in the original description. In the ♂ the true *basal tergite* is small, not reaching to the sides of the abdomen, slightly broader behind than at the base, pale and whitish; its surface bare except for a few very short bristles in the middle, its

hind margin bearing slightly longer bristles. *Tergites* 2, 3, and 4 have their hind margins set with moderately long bristles, rather far apart (especially on tergite 4) ; tergite 2 has its entire surface covered with short fine bristles ; tergite 3 has its surface similarly covered, excepting the extreme basal portion ; tergite 4 has its surface bare except for the middle posterior portion, where there are about two irregular rows of short bristles just in front of the hind margin. *Tergites* 5 and 6 are more arched and produced backwards in the middle ; their surfaces are bare, their hind margins set with long bristles far apart, of which some in the middle are very long. *Anal segment* short and blunt, its apex rather broad, its hind angles rounded ; its surface is bare in front, but bears a few erect short bristles in its posterior part ; there are 6 long bristles on the hind margin, 3 on either side in the region of the rounded hind angles. Ventrally the *basal sternite* bears two or three irregular rows of short bristles on the posterior part of its surface, and the teeth of the etenidium are close and fairly long. *Sternites* 2 and 3 are short, their hind margins set with long strong bristles rather spaced out (the space between each two bristles is about equal in breadth to twice the thickness of a bristle at its base) ; these sternites bear on the posterior parts of their surfaces short fine bristles, which are more marked on sternite 2 than on sternite 3. Behind sternite 3 is a plate (=*sternites* 4 + 5) longer than the two preceding sternites taken together ; its margin is nearly truncate in the middle behind, and curves obliquely forward on either side of this truncate portion ; the truncate portion bears several rows of very short black thorn-bristles ; on either side of these are three very long bristles, and the lateral margins also bear some long bristles ; the surface is bare except quite near the margins, where there are some rather long, fine, erect bristles in front of the thorn-bristles, and shorter erect bristles near the side-margins. The *claspers* lie nearly parallel ; their apices are blunt, curved upwards, and dark-pigmented ; each clasper bears a series of bristles becoming gradually longer towards its base, the one at the base being very long.

In the ♀ (Pls. X., XI. figs. 6, 7) the true *basal tergite* is small, similar to that of the ♂. *Tergite* 2 is of remarkable form : large and transverse, with hind margin slightly arcuate, and set fairly closely with moderately long bristles, those in the middle a little longer than those at the sides ; the surface of the tergite has a median longitudinal line of pale connexivum, bare of bristles ; on either side of this it is more

firmly chitinized, pale yellowish, and covered with scattered short bristles; in shrunk or dried specimens the tergite sometimes collapses along the median longitudinal line in such a way that it appears to be divided into two separate halves, though this is not really the case. The rest of the abdomen (exclusive of the anal segment) consists of whitish *connexivum*; the middle part of this bears stout bristles covering a roughly triangular area with its apex directed backwards and reaching to about $\frac{3}{4}$ the length of the connexivum; the bristles on the front part of this area are rather short, but become gradually longer towards the apex of the area; the lateral parts of the connexivum bear exceedingly short minute bristles; the extreme posterior part is quite bare except for one pair of bristles in the middle, at the base of the anal segment. *Anal segment* short and bilobed; each lobe has 4 very long and stout bristles at its apex, and several very short erect ones on its outer side; the position of the lobes varies according to the degree of distension of the abdomen; in the type from Burma they are wide apart (fig. 8), in the Ceylon specimen (fig. 6) they lie close together. Ventrally the *basal sternite* is as in the ♂. Behind it is an area densely set with long and stout dark bristles, the arrangement of which cannot be exactly made out owing to shrinkage of the membrane. Behind this are two nearly similar short *sternites*; each has a median longitudinal pale line, on either side of which it is yellowish and more firmly chitinized; each has a transverse series of erect bristles across its surface; each has a series of rather long bristles on its hind margin, set wide apart, those on the posterior of the two sternites standing in a bisinuate line; these marginal bristles are all directed backwards except at the hind angles, at each of which are 3 long bristles directed abruptly outwards. The large *subgenital plate* is longer than the two preceding segments taken together, trapezoidal, slightly narrowed behind, with broadly rounded hind angles; its margin has 3 long bristles at each hind angle; the surface is quite bare except in the posterior part, where there is a group of about 6 erect bristles on either side of the middle line; the plate has a median longitudinal line, pale and more weakly chitinized than the parts on either side. In spirit-specimens the surface of the plate is quite continuous (fig. 7), but in the dried original type this weaker middle line has collapsed into a deep furrow dividing the plate into two halves* (fig. 9).

* To this fact are due Speiser's words (*l. c.*) "am Hinterrande mitten scharf eingezogen und durch eine Längsfurche in zwei Hälften getheilt."

The form of the ♀ abdomen in this species is characteristic, particularly the median longitudinal line of weakness possessed by the second tergite, the long dark bristles covering the median area of the dorsal connexivum, and the form of the subgenital plate. *N. euxesta* does not closely resemble any species which I have seen.

Loc. Burma, Ceylon.

The original specimens from Burma were taken from *Hipposideros* (=*Phyllorhina*) *armiger*. Fryer's specimens were found on *Hipposideros lankadiva* at Peradeniya, Ceylon, on two occasions—vii. 1911, 1 ♂, 1 ♀; 8. v. 1912, 1 ♂, 3 ♀.

Subgenus **Listropodia**, Kolenati.

4. *Nycteribia* (*Listropodia*) *allotopa*, Speiser.

Nycteribia (*Listropodia*) *allotopa*, Speiser, Arch. Naturg. lxvii. 1, 1901, p. 37.

Nycteribia (*Listropodia*) *insolita*, Scott, Trans. Ent. Soc. London, 1908, p. 364, pl. xviii. figs. 9–13.

Nycteribia (*Listropodia*) *allotopa*, Scott, Arch. Naturg. lxxix. A, 1913, p. 97.

This species was not previously known from Ceylon, but in discussing a long series from Formosa and Speiser's original types from Sumatra, in 1913, I mentioned (*l. c.*) that I had before me specimens from Ceylon. They are considerably smaller than the Sumatran and Formosan examples, but in all structural points agree with them very closely. I also referred to the variability of certain characters. Thus, in the Formosan series the fourth tergite in the ♂ has its surface sometimes quite bare, sometimes bearing scattered short bristles; the series from Ceylon includes only 3 ♂, all of which have short bristles on the surface of this segment. The second tergite in the ♀ varies in the Formosan series in a similar way; in the Ceylon series it again varies in like manner, its surface being quite bare in 5 ♀, but in the remaining 1 ♀ bearing short bristles in the whole middle region from the front to the hind margin, while remaining quite bare towards the sides. Rather similar variation has been observed in *Penicillidia jenynsi* (see p. 213).

Loc. Sumatra, Ceylon, China, Formosa.

The series from Ceylon was collected by Fryer from *Miniopterus schreibersi* at Peradeniya, x. 1911 (1 ♂, 1 ♀), and 30. i. 1912 (2 ♂, 5 ♀).

5. *Nycteribia* (*Listropodia*) *parvula*, Speiser.

Nycteribia (*Listropodia*) *parvula*, Speiser, ♀, Arch. Naturg. lxvii. 1, 1901, p. 38.
Nycteribia (*Listropodia*) *sauteri*, Scott, ♂ ♀, Trans. Ent. Soc. London, 1908, p. 366, pl. xviii. figs. 14-18.
Nycteribia (*Listropodia*) *parvula*, Scott, Arch. Naturg. lxxix. A, 1913, p. 98.

Fryer collected 1 ♂ of this species from *Miniopterus schreibersi* at Peradeniya, 30. i. 1912. It was previously unknown from Ceylon. On the same date and at the same place he obtained *N.* (*L.*) *allotopa*, Speiser, from the same host-species, but whether from the same individual bat is not recorded. In any case these two species have on several occasions been found at the same time and place on *M. schreibersi* (see Scott, 1913, *op. cit.*, bottom of p. 93 and p. 100).

Loc. Sumatra, Ceylon, Formosa.

Cyclopodia, Kolenati.

6. *Cyclopodia ferrarii* (Rondani). (Pl. XI. figs. 10–15.)

Nycteribia ferrarii, ♂, Rondani, Ann. Mus. Genova, xii. 1878, p. 151.
Cyclopodia ferrarii, ♂ ♀, Speiser, Arch. Naturg. lxvii. 1, 1901, pp. 45, 55.

This species was described by Rondani from a single dried ♂ from Java. The ♀ was described for the first time by Speiser (*l. c.*) from specimens from Burma. Fryer's material from Ceylon (whence the species is now for the first time recorded) includes several specimens, which I have been able to compare with Rondani's type and with 9 ♂ and 6 ♀ (all dried) from Sumatra, these and the type having been all kindly lent by Dr. R. Gestro from the Genoa Museum.

The following amplifications and modifications of earlier descriptions are made principally from the three Ceylon specimens in alcohol, though I have, of course, also examined the dried specimens from Sumatra :—The *thorax beneath* is longer than broad, bluntly rounded in front, with sides diverging backwards so that the greatest breadth is reached just before the middle legs ; the median longitudinal line is not excavated behind ; the bristles on the hind margin are scarcely any longer than those on the surface, in the middle part they do not project over the margin at all, only at the posterior angles are there some rather longer than those on

the surface. A dorsal view of the ♂ ABDOMEN is shown in Pl. XI. fig. 10. Its *ventral surface* (fig. 11) was not described by Speiser; the basal sternite bears two rather irregular rows of short bristles before the hind margin, and the teeth of the ctenidium are long and strong; the two succeeding sternites bear scattered short bristles on their surfaces and stout moderately long bristles set in a fairly close series on their hind margins; of these two sternites the third is longer than the second; then follows a very long *fourth sternite*, as long as the two preceding together, gradually narrowing to its distal end, with its hind margin slightly bisinuate, bearing scattered short bristles on its surface (except just in front of the hind margin, where there is a bare space), and longer bristles set rather far apart on its hind margin, and standing outwards on its sides. The *claspers* are very remarkable. They are very long and lie in contact with one another throughout their length. At the base each clasper bears one long and two short bristles, otherwise they are almost entirely bare; only in the apical half do they bear some exceedingly fine and exceedingly short bristles, and in one specimen where the actual apices are visible these bear each a short stout black spine (Pl. XI. fig. 12).

♀ ABDOMEN (Pl. XI. figs. 13, 15).—The basal tergite is bare on its surface and bears long stout bristles, not set very close, on its hind margin. This is followed by a long whitish connexivum covered with short bristles. At the posterior end of this connexivum and just in front of the anal segment is a single brown area (see fig. 14), with its anterior margin rounded, its surface bare, and its hind margin bearing about 4 or 5 long bristles. Neither in the ♀ in alcohol from Ceylon nor in the dried Sumatran ♀ ♀ from the Genoa Museum can I see any sign of division in this brown plate or area, and therefore do not understand Speiser's reference (*l. c.*) to "zwei symmetrisch zu beiden Seiten liegende halbmondförmige, dunkelbraune Chitinplatten" lying at the posterior extremity of the penultimate segment; there is no trace of such structures dorsally situated in the material before me. The *anal segment* (Pl. XI. fig. 14) has its brown chitinous surface bare; this brown surface is cleft in the mid-dorsal line behind by a triangular space extending about halfway to the base of the segment; the margins of the brown chitinous portion on either side of this space and at the apical angles bear long stout bristles; the cleft or space itself is occupied by an area of whitish

membrane with very fine and short bristles on its hind margin, and which sometimes collapses in dried specimens so as to make the segment appear distinctly bilobed.

Ventral surface (Pl. XI. fig. 15): the basal sternite as in the ♂; this is followed by a long expanse of whitish connexivum, set with short bristles as on the dorsal surface, and bearing two small brown chitinous areas on its hind margin on either side of the middle line. Behind this is a segment with its surface bare of bristles, composed chiefly of whitish connexivum, but with two much larger brown chitinous areas on either side of the middle line, each of these areas bearing 4 long bristles on its hind margin. The subgenital plate is completely divided from base to apex, by a narrow area of pale membrane, into two brown firmly chitinized portions, each bearing several long strong bristles at and near its apex.

Loc. Java, Sumatra, Burma, Ceylon.

The host on which the type was found in Java is not recorded. The Sumatran specimens (Mus. Genova) are all labelled "Balighe, x. 1890–iii. 1891, E. Modigliani," and one also is labelled "*Cynopterus*?" Ceylon: the three specimens are all from *Cynopterus brachyotis ceylonensis*; all are from Peradeniya, 2 ♂ obtained xi. 1911 and 1 ♀ obtained iii. 1912 (*Fryer*).

7. *Cyclopodia roylei* (Westwood). (Pl. XII. figs. 16, 17.)

Nycteribia roylei, ♂, Westwood, Trans. Zool. Soc. London, i. 1835, p. 290, pl. xxxvi. figs. 35, 36; Kolenati, Horæ Soc. ent. Ross. ii. 1863, p. 87, pl. xiv. fig. 30.

Cyclopodia roylei, ♂, Scott, Trans. Ent. Soc. London, 1908, p. 368, pl. xviii. fig. 19.

Nycteribia (*Acrocholidia*) *chlamydophora*, ♂ ♀, Speiser, Fascic. Malay., Zool. vol. i. 1903, p. 123.

For examination of this species I have had before me the following material:—Westwood's *type* ♂ of *N. roylei*, preserved dry, kindly lent by Professor Poulton from the Hope Museum, Oxford; a co-type ♀ of Speiser's *N. chlamydophora* preserved in alcohol in the Cambridge Museum; 3 ♂ and 1 ♀, unnamed and in alcohol, from Bihar (India); 14 ♂ and 23 ♀, also unnamed and preserved in alcohol, from Ceylon.

My examination of Westwood's type ♂ in 1908 showed that it belonged to the genus *Cyclopodia*. Subsequently, on examining the co-type ♀ of *N. chlamydophora*, I saw that this species also is really a *Cyclopodia*, but, having no ♂

specimen of it, I could not tell that it was identical with *roylei*. Having now examined the large unnamed material from Ceylon and India, I find that the ♂ ♂ agree closely with Westwood's type of *roylei*, while the ♀ ♀ correspond equally closely with Speiser's co-type of *chlamydophora*; I am therefore convinced that the two species are identical.

The three rings on the *tibiæ* are often indistinct on the dorsal side, but quite distinct on the ventral. In 1908 (*l. c.*) I expressed doubt as to whether the dark-pigmented *eyes* are composed of one or more ocelli. I have now mounted the head of a specimen in balsam, but even so the number of facets is hard to determine owing to the opacity of the dark pigment beneath; but in this specimen, at any rate, there are certainly at least two facets in each eye*.

In the ♂ *abdomen* the bristles extend in unbroken series across the hind margins of tergites 2, 3, 4, and 5. In the type and in some of the new specimens they form a similar unbroken series on the hind margin of the sixth (*i. e.* penultimate) segment; but in other specimens the series is rather widely interrupted in the middle of this segment, while in some others (intermediates) the bristles become short and scanty in the middle part, but are not altogether absent. Speiser, in his description of *chlamydophora* ♂, refers to sternites 2 and 3 as "auf der Fläche beborstet." In several specimens which I have examined closely sternite 2 has scattered short bristles on its surface, but sternite 3 is nearly bare, having only an irregular transverse series of very short bristles a little behind the middle; in this sternite also the bristles on the hind margin are very short and set far apart, only the 3 or 4 middle ones being rather longer. In other ways the abdomens of the ♂ ♂ from Ceylon and India correspond with Speiser's description of *chlamydophora*.

The ♀ ABDOMEN (Pl. XII. figs. 16, 17) is, as justly remarked by Speiser, characterized by the great length of the basal segment, both dorsally and ventrally. Dorsally, the long *basal tergite* is divided longitudinally into two parts by

* Since writing the above, I have remarked certain particulars in which *C. roylei* differs from all typical species of *Cyclopodia* with which I am acquainted. This is notably the case in the form of the head. Although *C. roylei* has pigmented eyes of more than one facet, yet the head is strongly arched dorsally and compressed *laterally*, as in *Penicillidia* and *Nycteribia*; while in *C. sykesi* and its allies, and in *C. ferrarii*, the head is broad and flattened dorsally, the compression being in the horizontal, not in the vertical, plane. This and some other points make me feel some doubt as to the final generic position of *C. roylei*. Possibly a new genus may be needed for its reception.

a median line of pale connexivum ; each part is whitish and soft in its basal quarter, brownish and more strongly chitinized in its remaining portions ; each bears short, scattered, suberect bristles in its basal half, in the apical half the bristles are absent towards the outer margin, but scantily present near the median dividing-line ; immediately on either side of the dividing-line the segment is produced into an angular process, more darkly pigmented, and having its margin set with rather longer, stoutish, bristles. Behind this basal tergite is an area of pale *connexivum*, bearing two slightly darker areas, one on either side, about halfway between the middle line and the side of the body; each of these areas bears several very short bristles at its anterior, and several rather long bristles at its posterior, extremity ; there is also a pair of bristles on the connexivum between the posterior extremities of the dark areas. *Anal segment* very short, with a transverse series of long bristles at about half its length ; this series is widely interrupted in the middle, there being about four bristles on either side.

Ventrally (Pl. XII. fig. 17) the *basal sternite* is of great length, with a dark median longitudinal line, and the short bristles on its surface do not extend quite to the hind margin ; the *ctenidium* does not extend right across the margin, but ends on either side a little way from the angle, the space between it and the angle bearing several marginal bristles. The succeeding *sternites* (2, 3, and 4) are curiously arched and bent forwards in the middle; the chitinous portions of sternites 2 and 3 are widely interrupted in the middle, so that these sternites are represented by connexivum medially and a chitinous plate on either side ; in sternite 4 the chitinous portion is continuous, and forms a narrow arched strip (see Pl. XII. fig. 17). The surfaces of these sternites are bare, but their hind margins bear moderately long bristles set at regular intervals, which, however, are reduced in sternite 4 to only three or four bristles on either side ; [it is only in specimens with abdomens greatly distended that the median parts of these sternites are visible ; in most they are hidden under the basal sternite]. *Sternite* 5 is of peculiar shape ; produced in front into an apex extending into the arch formed by the fourth sternite ; hind margin broadly rounded, without marginal bristles ; the sternite is divided by a pale median longitudinal line ; it has a pair of very short bristles, one on either side of the median dividing-line near its base, a second pair of slightly longer bristles similarly situated at about its middle, and two or three still longer bristles on either side of the median

line near the apex; [some variation is noticeable, *e. g.* the ♀ from Bihar has an extra four bristles situated two on either side of the median line midway between the basal and median pairs, and this specimen also has the apex of the sternite shallowly emarginate, a character not observed in any other]. *Subgenital plate* almost hidden under sternite 5, undivided, with bluntly rounded apex, and several longish bristles on and near its margin on either side.

The form of the ♀ abdomen in *C. roylei* is quite unlike that of any other Nycteribiid known to me. The very great length of the basal segment is highly remarkable, as, too, is the extraordinary arching forwards of the second, third, and fourth sternites. The position of the *spiracles* also appears curious; two pairs are visible dorsally on the connexivum, one pair rather close to the middle line, immediately adjacent to the inner side of the anterior extremities of the lateral dark areas, and another not much posterior to this, but situated quite at the sides of the body. Two other pairs are visible on the connexivum ventrally, close behind the outer angles of sternites 2 and 3.

Loc. Malay Peninsula, Ceylon, India.

Westwood's type of *Nycteribia roylei* was recorded from "India orientalis" without further particulars, and the host was unrecorded. The specimens described by Speiser as *Nycteribia chlamydophora* were from the Malay Peninsula, from Biserat, Jalor, and from Bukit Besar, in both cases on *Scotophilus castaneus*, Horsfield, which Mr. Oldfield Thomas considers to be merely a form of *Scotophilus kuhli*, Leach (see below).

3 ♂ and 1 ♀ were obtained by T. Bainbrigge Fletcher on *Scotophilus heathi*, Horsfield, at Pusa, Bihar, India, vi. 1911. Fryer's material from Ceylon is as follows:— 9 ♂ and 18 ♀ on *Scotophilus wroughtoni*, Thomas, Peradeniya, 1912; 3 ♂ on *Tylonycteris pachypus*, Peradeniya, 9. xii. 1911; 1 ♂ and 3 ♀ on the same host, Peradeniya, 20. xii. 1911; 1 ♂ and 2 ♀ probably from *Scotophilus wroughtoni*, collected i. 1912 at Ambalangoda by Dr. Bugnion and given by him to Fryer.

Also the British Museum contains the following:— 2 dried ♀ ♀, labelled "India: Hardwicke Bequest" (these were referred to as "*N. roylii*?" by Walker, List. Dipt. iv. p. 1148); 1 dried ♀ taken in Madras on *Megaderma lyra* (registration number 79. 51); 1 ♀ in spirit taken at Saidapet, Madras, 1. i. 1908, on *Scotophilus kuhli*.

8. *Cyclopodia sykesi* (Westwood).

Nycteribia sykesi, Westwood, Trans. Zool. Soc. London, i. 1835, p. 288, pl. xxxvi. figs. 1–25.
Cyclopodia sykesi, Kolenati, Horæ Soc. ent. Ross. ii. 1863, p. 82, pl. xiii. fig. 27; Speiser, Arch. Naturg. lxvii. i. 1901, pp. 39, 55.

Loc. India, Ceylon.

Fryer collected 2 ♂ and 2 ♀ from *Pteropus giganteus* (=*medius*), viii. 1911; the exact place in Ceylon is not stated.

100 specimens of this species, 57 ♂ and 43 ♀, were obtained from 11 specimens of *Pteropus giganteus* at Barberyn Island, Ceylon, in 1907 by T. Bainbrigge Fletcher. This large series was reported on by the present writer in Trans. Ent. Soc. London, 1907, p. 421. It was found that the ♂ ♂ showed practically no variation, while the ♀ ♀ varied in one respect, in the number of big tubercles (normally four) which stand in a group in the middle of the dorsal abdominal connexivum (see *op. cit.* p. 424).

9. *Eucampsipodia hyrtli* (Kolenati). (Pl. XII. figs. 18, 19.)

Nycteribia hyrtli, Kolenati, Paras. d. Chiropt. Brünn, 1856, p. 42.
Eucampsipodia hyrtli, Kolenati, Horæ Soc. ent. Ross. ii. 1863, p. 78, pl. xiv. fig. 26 *a–c*; Speiser, Arch. Naturg. lxvii. 1. 1901, p. 48; id. in Voeltzkow, Reise in Ost-Afrika, ii 1908, p. 202.

This species has not, to my knowledge, been recorded previously from Ceylon, but Fryer obtained 5 ♂ and 3 ♀, and the Cambridge Museum also possesses 1 ♂ (in a rather shrivelled state) obtained in that island some years ago by H. H. W. Pearson.

The ♂ ♂ differ only in some trifling details from Kolenati's (1863) description and figure. The basal sternite in the Ceylon specimens is bare towards its base, but has two irregular rows of short bristles towards its hind margin. The second sternite is not bare (as shown in Kolenati's fig. 26 *c*), but has on its surface several irregular rows of short bristles, which become longer and more numerous towards the sides. The third sternite has only a single row of bristles across its disc, and this row is widely interrupted in the middle. The fourth sternite has its surface quite bare in the Ceylon specimens, without a group of several long bristles on either side. (All these remarks apply only to the bristles on the *surfaces* of the segments, not to those on their hind margins.) The form of the *claspers* is characteristic, straight, lying close beside one another, rather

suddenly widened at the base, with short thorn-bristles along their outer margins towards the apex.

Kolenati only figured the ♂, and as I am not aware that the ♀ has been figured, figures of the dorsal and ventral aspects of its abdomen are given here (Pl. XII. figs. 18, 19). Dorsally, the *basal tergite* is bare except for some very short bristles irregularly placed immediately in front of its hind margin and for longer and shorter bristles on the hind margin. The *connexivum* is covered with scattered short bristles, except at its extreme base and in its apical portion, which are bare; behind the middle it bears two groups, consisting each of about 5 very long strong bristles, those of each group placed close together in a series running obliquely backwards and outwards. On the *anal segment* is a transverse series of 10 very long bristles, interrupted—in some specimens, at any rate—by a slight gap in the middle. Ventrally, the *basal sternite* is bare towards its base, but has two or three irregular rows of short bristles towards its hind margin; as in the ♂, the teeth of the ctenidium are strong and close. On the *connexivum* the short bristles are arranged in rather irregular transverse series; the anterior part bears about 6 of these series, and 8 very long bristles, of which those near the middle line are placed further forward than the outer ones; the arrangement is shown in Pl. XII. fig. 19, which is taken from a ♀ with abdomen greatly distended. Behind these anterior series of short bristles is a short gap, an area bare of bristles, extending across the abdomen. Behind this gap are 6 more series of bristles, behind the first three of which is an indication of another gap, though this is much less marked than the anterior one. The hindmost series has several of the bristles longer than the rest, one towards either side of the abdomen being very long. Behind the last series of bristles is a bare area of connexivum; under the genital opening is a more or less chitinous brown area, with an indication of a longitudinal division into two halves. Across the middle of it is a series of bristles, while its hind margin is set with longer and shorter bristles, some being very long. The arrangement is not so regular in all specimens as in the one figured; sometimes the bristles on the surface are much more scattered.

Figure 19 also shows the way in which the thorax is narrowed, its sides "cut away," so to speak, in front, which causes the *thoracic ctenidia* to show very conspicuously in a ventral view.

Loc. Africa (Senegal, Egypt); Comoro Islands (Grand Comoro); Sumatra; Burma; Ceylon.

Fryer's specimens were collected at Peradeniya:—from *Tylonycteris pachypus*, xii. 1911, 1 ♂; from *Rousettus seminudus*, xii. 1911, 1 ♂, and iv. 1911, 3 ♂, 3 ♀.

Speiser states in Voeltzkow's 'Reise' that the specimens collected in Grand Comoro were from a species of *Rousettus*. In the same work he remarks on the very wide distribution of *Eucampsipodia hyrtli*. In Arch. Naturg. (*l. c.*) he stated that it has been taken in Egypt on *Cynonycteris ægyptiaca*, and Kolenati (Horæ Ross., *l. c.*) records it from *Xantharpyia ægyptiaca* on the Senegal; I am informed that both these names are synonyms of *Rousettus ægyptiacus*.

II. Re-description of *Nycteribia parilis*, Walker.

This species was described by Walker from a single ♂ collected at Batchian (Moluccas) by Wallace and preserved dry in the British Museum. Walker's description is as follows: "*Nycteribia parilis*, n. s. Pallide lutea. Pale luteous. Length of the body $\frac{1}{2}$ line." As it is quite impossible to say from this description even to what genus the species belongs, Speiser, in his work published in 1901, merely included it as a doubtful species in his list. I have carefully examined Walker's type and find that the species belongs to the subgenus *Listropodia* of *Nycteribia*. I also found in the British Museum another ♂, preserved dry, from Australia, belonging to the same species. I have also examined in the British Museum 3 ♂ and 2 ♀, preserved in spirit, collected by Mr. Frederick Muir in Amboyna in 1908, and find these also to be *N. parilis*. These Amboyna specimens, and a number of others of the same species obtained at the same time and place, had previously been examined by Speiser and named by him in manuscript *Listropodia tolisima*. I therefore have to give this name as a synonym of *parilis*, though, as far as I am aware, no description of *tolisima* has been published. Muir, in his paper cited below, dealing with *Ascodipteron* and other Diptera Pupipara found by him in Amboyna, refers several times to "*Lipoptena tolisina*, Speiser," which is probably an error for "*Listropodia tolisima*, Speiser," and may thus have reference to the species under discussion.

Moreover, in 1908 Speiser described a species from Madagascar, *Nycteribia stylidiopsis*. Judging from the description and figures, this must be very closely allied to, if not identical with, *Nycteribia parilis*. Some slight differences are apparent, such as the presence in the figures of *stylidiopsis* of fine short bristles on the surfaces of certain

segments which are bare in the specimens of *parilis* before me. But these differences are no greater than some which have been found to be due to individual variation in certain other species.

I have endeavoured without success to obtain the loan of specimens of *stylidiopsis* for comparison with *parilis*, a comparison which alone could settle the question of their possible identity. I must therefore be content to insert below the name, and a reference to the description of, *stylidiopsis* as a possible synonym of *parilis*.

At all events, it is now possible to give a full description and figures of both sexes of *Nycteribia parilis*, Walker. They are made from the spirit-specimens collected by Muir in Amboyna, in which the characters can be clearly made out, and which correspond closely with Walker's type.

Nycteribia (*Listropodia*) *parilis*, Walker.
(Pl. XII. figs. 20–23.)

Nycteribia parilis, Walker, Journ. Linn. Soc. London, Zool. v. 1861, p. 300; Speiser, Arch. Naturg. lxvii. 1. 1901, p. 52.
? *Nycteribia* (*Listropodia*) *stylidiopsis*, Speiser, ♂ ♀, in Voeltzkow, Reise in Ost-Afrika, ii. 1908, p. 200.
Nycteribia (*Listropodia*) *tolisima*, Speiser, MS.
? *Lipoptena tolisina*, Muir, Bull. Mus. Zool. Harvard, liv. 1912, pp. 351–366, pl. ii. (larva).

N. parilis is a minute pale-coloured *Nycteribia*, belonging to the subgenus *Listropodia*, that is, having the tibiæ broad and flattened. Its most remarkable feature lies in the form of the ♀ abdomen, in which a greater number of segments are distinguishable than is the case in the ♀ ♀ of many Nycteribiidæ. A glance at fig. 22 will show that 4 segments are distinguishable dorsally in addition to the anal segment, the dorsal chitinous portion of which is symmetrically divided in a remarkable manner.

Length of the body 1·25–1·5 mm.

Colour pale, yellowish. *Head* bare, with only two bristles on the front margin of the vertex and a very few more on the margins of the cheeks. *Femora* with their anterior surfaces bearing short bristles in the front pair, nearly bare in the middle and hind pairs; posterior surfaces bare of bristles except in the lower portion towards the base; lower edges bearing some short bristles, and a very long erect one directed forwards, situated at about $\frac{3}{4}$ the length from the base; upper edges bare except for a few short bristles near the apex, and two short erect ones situated respectively at about $\frac{1}{3}$ the length from the apex and immediately on the

through eye to base of caudal; 10 to 12 dark cross-bars; dorsal, anal, and pelvic fins with series of dark spots; caudal dusky.

Three specimens, 30 to 40 mm. in total length.

This species is very closely related to *C. interruptum*, Pellegrin (Bull. Mus. Paris, 1909, p. 151), from Serra d'Estrello, Rio Grande do Sul, in which the lateral line runs on 9 scales to below the origin of the dorsal fin, which has only 11 rays.

Corydoras macropterus.

Depth of body $3\frac{1}{5}$ to $3\frac{1}{2}$ in the length, length of head $3\frac{1}{2}$ to $3\frac{2}{3}$. Diameter of eye 5, interorbital width $2\frac{1}{4}$ to $2\frac{1}{2}$, length of snout 2 to $2\frac{1}{4}$ in the length of head. Suborbital narrow; cheek covered with short bristles, strongest in males; barbels nearly reaching gill-opening. Dorsal I 8; spine about $\frac{1}{2}$ the length of head; fin very elevated, second and third rays longest, when laid back reaching tip of adipose fin (♀) or base of caudal (♂); base of dorsal rather less than its distance from adipose fin, which is preceded by 3 to 5 median scutes. Anal I 6–7. Pectoral very long, extending to origin of anal. Scutes 24–25/21–22; humeral shields wide apart, each separated by 2 scutes from base of pelvic fin. 3 or 4 dark blotches on the back, more or less alternating with others on the lower part of the side, both series connected with an irregular lateral band; dorsal and caudal barred with series of spots; lower fins dusky.

Four specimens, 55 to 65 mm. in total length.

In coloration and in the bristles on the cheeks this species shows relationship to *C. kronei*, Ribeiro, but it differs in the shorter snout and broader interorbital region and especially in the produced dorsal and pectoral fins.

XXIII.—*The Pœciliid Fishes of the Genus* Jenynsia.

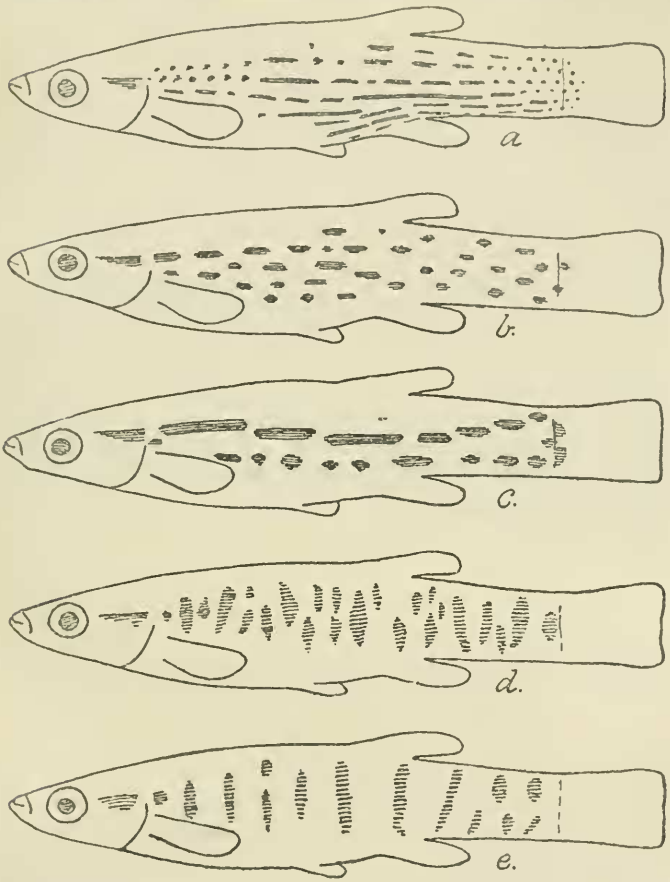
By C. Tate Regan, M.A.

(Published by permission of the Trustees of the British Museum.)

For many years the only known species of the genus *Jenynsia* was *J. lineata*, Jenyns *, originally described from Maldonado and Montevideo. In 1902 a second species,

* For the synonymy *v.* Garman, Mem. Mus. Comp. Zool. xix. 1897, p. 69.

J. pygogramma, was described by Boulenger* ; the types come from the Rio Cruz del Eje, Cordova, Argentina, and the species is well distinguished from *J. lineata* by its irregular scaling, the abdomen being naked and the scales on the back much smaller than on the sides of the body.



In 1906 I described *J. maculata*† from Cachi, Salta, Argentina, as a new species, and quite recently Haseman has added *J. eigenmanni*‡, a supposed new species from the Rio Iguassu.

* Ann. & Mag. Nat. Hist. (7) ix. 1902, p. 336.
† *Ibid.* (7) xviii. 1906, p. 154.
‡ Ann. Carnegie Mus. vii. 1911, p. 385, pl. lxxxii.

a small area of bare whitish connexivum extending to the hind margin; hind angles produced into short tubercles, each bearing 4 long bristles.

Ventrally (Pl. XII. fig. 23) 6 sternites are distinguishable in addition to the anal segment. *Basal sternite* as in ♂. *Sternite* 2 entirely membranous, short, with a transverse series of short bristles on its surface, and its hind margin indicated by a series of long bristles set wide apart. *Sternite* 3 longer, also entirely membranous, with a similar series of long bristles on its hind margin, and a series of very short and minute bristles across its disc. *Sternites* 4, 5, and 6: in each the anterior part consists of bare, pale membrane; in the posterior part of each are two chitinous areas, separated in the middle by a narrow space occupied by membrane; the chitinous areas have their hind margins set with alternating long bristles and short thorn-bristles, some of the long bristles being situated on and others immediately in front of the margin, and those furthest from the middle being directed strongly outwards. In front of the *genital opening*, near the middle line, is a transverse series of 4 short thorn-bristles, and behind these two long bristles. *Anal segment* with several short thorn-bristles at the sides and near the hind angles; (as previously mentioned each angle bears 4 long bristles).

Loc. Batchian (Moluccas); Amboyna; Australia; [?Madagascar].

Batchian, 1 ♂ (the type), collected by A. R. Wallace, host unrecorded; preserved dry in British Museum.

Amboyna, a number of ♂♂ and ♀♀ from *Miniopterus schreibersi*, 1908, F. Muir.

Australia, 1 ♂ preserved dry in British Museum, labelled "Australia: presented by Mr. Tomes, 57. 7: on *Miniopterus australis*."

[*Madagascar*, see above, remarks on *Nycteribia stylidiopsis*, Speiser].

Note.—One of the ♂♂ from Amboyna has a fungus of the Order Laboulbeniaceæ situated ventro-laterally on its anal segment. This adds another species to the list of Nycteribiids on which these fungi have been found: see Scott, Arch. Naturg. lxxix. A, 1913, pp. 96, 97.

EXPLANATION OF PLATES X.–XII.

Penicillidia fletcheri, sp. n.

Fig. 1. ♂, dorsal view of abdomen.
Fig. 2. ♂, ventral view of abdomen.
Fig. 3. ♀, dorsal view of abdomen.

Fig. 4. ♀, ventral view of thorax and abdomen.
Fig. 5. Var. *pumila*, var. n., ♀, dorsal view of abdomen (to slightly larger scale than the preceding figures).

Nycteribia (*Acrocholidia*) *euxesta* (Speiser).

Fig. 6. ♀, dorsal view of abdomen.
Fig. 7. ♀, ventral view of thorax and abdomen.
Fig. 8. ♀, anal segment of Speiser's original type (dried), more highly magnified.
Fig. 9. ♀, subgenital plate of original type (dried), to same scale as fig. 8.

Cyclopodia ferrarii (Rondani).

Fig. 10. ♂, dorsal view of abdomen.
Fig. 11. ♂, ventral view of abdomen.
Fig. 12. ♂, apex of claspers, more highly magnified.
Fig. 13. ♀, dorsal view of abdomen.
Fig. 14. ♀, dorsal view of anal segment and of the chitinous plate in front of it, more highly magnified.
Fig. 15. ♀, ventral view of abdomen.

Cyclopodia roylei (Westw.).

Fig. 16. ♀, dorsal view of abdomen.
Fig. 17. ♀, ventral view of abdomen.

Eucampsipodia hyrtli (Kolenati).

Fig. 18. ♀, dorsal view of much contracted abdomen.
Fig. 19. ♀, ventral view of much distended abdomen.

Nycteribia (*Listropodia*) *parilis*, Walker.

Fig. 20. ♂, dorsal view of abdomen.
Fig. 21. ♂, ventral view of abdomen.
Fig. 22. ♀, dorsal view of abdomen.
Fig. 23. ♀, ventral view of thorax and abdomen.

XXVIII.—*New Species of* Paralastor, *Sauss.* (*Hymenoptera, Fam.* Eumenidæ), *collected by Mr. R. E. Turner in S.W. Australia.*

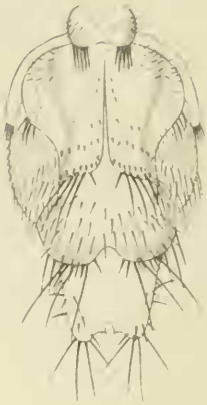
By R. C. L. Perkins, M.A., D.Sc., F.Z.S.

The first five forms of *Paralastor* here described, which were collected by Mr. R. E. Turner at Yallingup, S.W. Australia, from November to January 1913, are almost identical in colour-pattern, the yellow bands and spots differing a little in depth of colour in different species.

All have the following markings in both sexes:—Two spots on the front of the pronotum, one each side on the mesopleura beneath the tegulæ, a pair on the scutellum, and an apical band on the first two abdominal segments yellow,

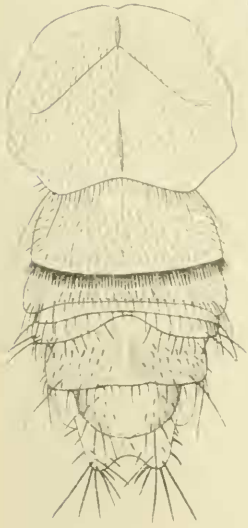
1.

2

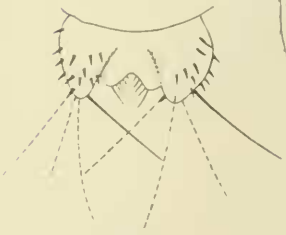


3.

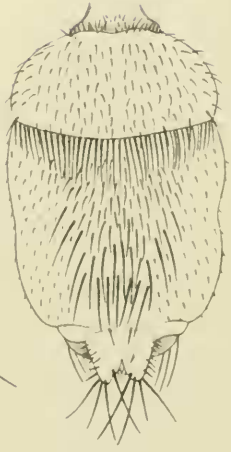
5



4.



8.



6.

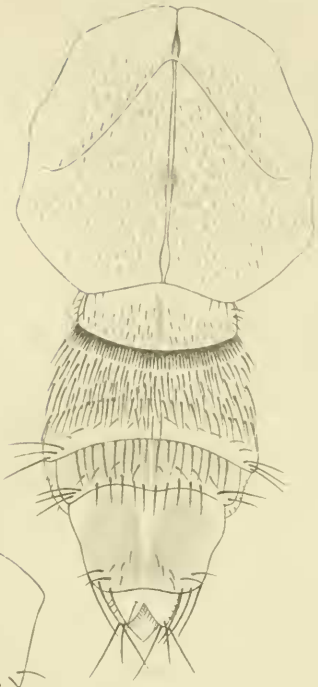
H Scott del

Cambridge University Press

ORIENTAL MYCTERIDÆ

Ann. & Mag. Nat. Hist. S. 8. Vol. XIV. Pl. XI

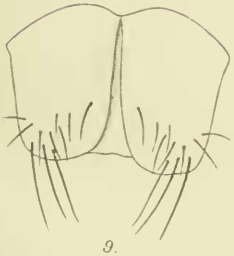
10.



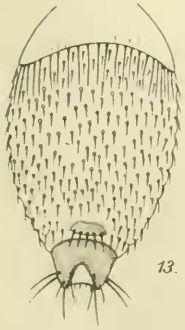
7.

11.

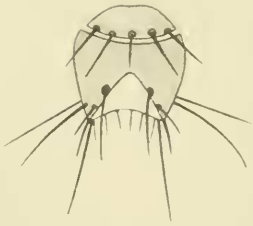
12.



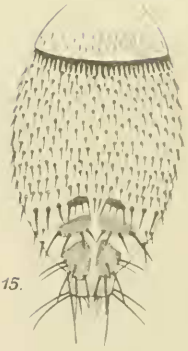
9.



13.



14.



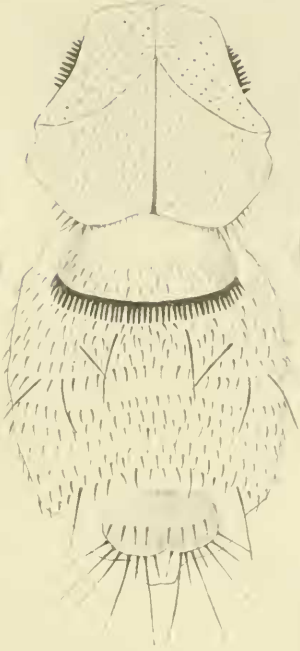
15.

H. Scott del.

Cambridge University Press

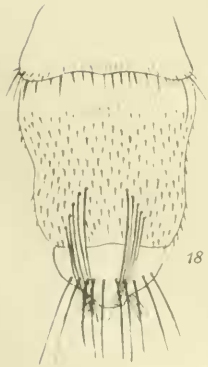
ORIENTAL NYCTERIBIDÆ

16.

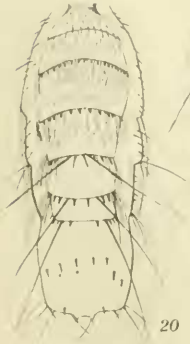


19

17.



18



20

21.

22.

23.

H Scott del

Cambridge University Press

ORIENTAL NYCTERIBIIDÆ